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FLORDO SPRAY

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The need for a fungicide somewhat different from those in current use became evident in 1931 when gladiolus leaf spots, due to various infectious fungi, were proving particularly destructive. No spray in general use at that time was satisfactory for gladioli and other ornamentals having foliage difficult to wet.

It seemed logical that a mixture containing copper as the toxic ingredient and soap as the spreading agent might meet the requirements if they could be properly mixed. After many trials, a homogeneous mixture was obtained when soap and copper sulfate were combined in a ratio (by weight) of 3 or more to 1. Addition of small amounts of ammonia greatly improved the texture of the resultant spray. This spray wet the foliage of gladioli and other plants difficult to coat, and its copper content was sufficient to protect the plants against fungous invasion. All excess liquid drained from the plants, leaving only a thin, uniform, and comparatively inconspicuous coating, making the spray particularly suited for use on ornamentals. No serious burning on gladioli was observed in any case.

Name and Formula: It is suggested that the name FLORDO be used to designate this spray.

The soap-copper ratio of 3 to 1 used in trials to date is a rather delicate balance of the two ingredients and any excess copper sulfate results in the prompt formation of a waxy precipitate difficult to remove. For this reason, the use of a 4 to 1 ratio seems preferable, as follows:

	Home Garden Basis 4 gallons	Commercial Basis 100 gallons
SOAP (granular or chip form)	6 ounces	10 pounds
COPPER SULFATE (bluestone "snow")	1½ ounces	2½ pounds
AMMONIA (strength 26 to 28%)	1½ ounces	1 quart

Proportions given above are only approximately the same, but amounts are convenient for measuring. The amount of soap and ammonia may be increased slightly without harm, though larger amounts are seldom needed.

Not all soaps are satisfactory for preparing Flordo, though several brands of better grade soaps have been found suitable. A pine-tar soap has been used mostly in tests to date. In addition to being relatively non-caustic, the soap should dissolve quickly and completely in warm water. Liquid soaps would be especially desirable except for their greater cost (at least twice the weight of liquid soap usually being required).

Finely ground bluestone, such as is sometimes referred to as bluestone "snow", is preferable. Bluestone snow readily dissolves in cold water with stirring. Containers made of either clay, glass, wood, enamelware, or some other non-reactive material, should be used.

Strong ammonia solution containing from 26 to 28 percent of ammonia gas should be used. This may be had through local druggists or fungicide dealers, at comparatively low cost in quantities of one gallon or more. All containers must remain sealed or tightly stoppered at all times.

Preparation: The soap and bluestone must be dissolved separately, no trace of soap or other alkaline material being permitted to enter the bluestone solution at this time.

When making small amounts of spray, the soap and bluestone are each dissolved in half the total volume of water required. The two solutions

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are then poured together rapidly and stirred briefly. It makes little difference whether the bluestone solution is poured into the soap solution, the soap into the bluestone, or both poured simultaneously into a third container. The object is to bring the soap and bluestone into complete contact with each other as quickly as possible. After the two ingredients are mixed, the ammonia is added and stirred.

For making large quantities of spray it is more convenient to concentrate the bluestone solution and add this to a dilute soap solution. One pound or more of bluestone may be dissolved in a gallon of water. A simple procedure for preparing large amounts of spray is as follows:

1. Thoroughly dissolve the soap in a small amount of water (which may require brief heating), and separately dissolve the bluestone.
2. Fill spray tank with water to a point close to final volume required. Start agitator, and continue agitation throughout the mixing process.
3. Pour dissolved soap into spray tank, and allow time for thorough mixing with the water.
4. Pour into tank the concentrated solution of bluestone, a part at a time, allowing each portion of bluestone solution to be thoroughly mixed with the soap before more is added.
5. Add ammonia and allow time for mixing with other ingredients.

A glassful of prepared spray should be critically examined before applying. It should have a smooth, soapy texture, forming a thick layer of white soap bubbles when shaken vigorously. Its color will depend mainly on the kind of soap used, varying from olive green to light blue. The liquid should be uniform throughout, containing few or no particles of any kind. If a precipitate or an appreciable curd should develop, this may be removed in most instances, assuming the spray has been properly made, by increasing the ammonia content slightly.

Trials to Date: During the past five years Flordo has been applied to growing plants many times and at all times of the year. Treated plants include gladioli, roses, Easter lilies, asparagus "ferns", avocados, grapes, and various ornamentals. This spray proved to be an effective fungicide, protecting both foliage and fruit. Additional plants treated include watermelons, tomatoes, and other vegetable crops. In addition to its value as a fungicide, Flordo has proved to be effective in combatting aphids, red spiders, and other soft-bodied insects. While all spray preparations, and even water itself, occasionally injure foliage, injury following the application of Flordo has never been serious. Superior covering and adhesive qualities, combined with only a small amount of noticeable residue, make this spray especially desirable for use on ornamentals and other plants.

Cost: Soap is the chief item of expense in preparing Flordo, good quality soaps costing from 13 to 20 cents a pound retail. With bluestone selling at 7 cents a pound and ammonia at 25 cents a quart, total cost of the prepared spray is about 2 cents a gallon. This price can be reduced by purchasing soap in wholesale quantity. Regardless of price, the use of Flordo will in many instances be warranted because of better coverage, reduced residue deposit, and the insect control gained.

General Considerations: Flordo should be applied with thoroughness. Since the spray is very adhesive, applications should not be repeated unless considerable new growth, requiring protection, has formed.

Interruptions during the application of Flordo cause no serious disadvantage. The character of the spray does not change appreciably on standing for at least several days, and only slight settling occurs. In tightly stoppered containers the spray may be kept indefinitely.

In preparing the spray it is preferable to use soft water or water relatively low in mineral content. Bluestone in soft water forms a clear solution, but in hard water clouding or a white precipitate develops. Should this precipitate prove objectionable it may be cleared either by concentrating the bluestone solution or by adding to it a few drops of some strong acid.

Equipment containing a residue of lime-sulfur is unsuitable for use with the Flordo spray. It should first be thoroughly cleaned and flushed with soap solution.

While Flordo has been applied in combination with various additional insecticides without harm, caution is advised in using combinations until thoroughly tested on a small scale.